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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/797,723	03/11/2004	Katsunori Ichiki	042183	4127
38834	7590	07/13/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			SMITH, JOHNNIE L	
			ART UNIT	PAPER NUMBER
			2881	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/797,723

Applicant(s)

ICHIKI ET AL.

Examiner

Johnnie L. Smith II

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>0311</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 3-7 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,883,470 (Hatakeyama et al). In reference to claim 3, Hatakeyama et al teach a beam source (figures 2,3) comprising: a plasma generating chamber (21, figures 2, 3, Column 4 lines 12-13, Column 5 lines 2-34); a gas inlet port for introducing a gas into said plasma generating chamber (22); a plasma generator for generating positive-negative ion plasma containing positive ions and negative ions from the gas (24); a plurality of grid electrodes each having a plurality of beam extraction holes formed therein (29, 30); and a first power supply for applying a voltage between said plurality of grid electrodes to accelerate the positive ions or the negative ions so as to pass through said beam extraction holes formed in said grid electrodes and to extract a neutralized beam from the positive ions or the negative ions or an ion beam (column 4 lines 23-39).

3. In reference to claim 4, Hatakeyama et al teach a beam source, wherein said plasma generator comprises: a coil disposed near said plasma generating chamber (25); and a second power supply for intermittently supplying a high-frequency current to said coil (24).

4. In reference to claim 5, Hatakeyama et al teach a beam source, further comprising a plasma potential adjustment electrode disposed in said plasma generating chamber (29), wherein said first power supply applies a voltage between said plasma potential adjustment electrode and at least one of said grid electrodes (column lines 34-39).

5. In reference to claim 6, Hatakeyama et al teach a beam source, wherein said first power supply applies a low voltage such that accelerated ions do not practically sputter said at least one of said grid electrodes (column 4 lines 34-39).

6. In reference to claim 7, Hatakeyama et al teach a beam source, wherein said pluralities of beam extraction holes in said plurality of grid electrodes are aligned with each other (column 5 lines 24-26, figures 3).

7. In reference to claim 8, Hatakeyama et al teach a beam source, wherein said plurality of beam extraction holes in at least one of said grid electrodes has an aspect ratio of at least 10 (column 3 lines 35-56).

***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,883,470 (Hatakeyama et al). In reference to claims 1, Hatakeyama et al teach a beam source (figures 2,3) comprising: a plasma generating chamber (21, figures 2, 3 column 4 lines 12-31, column 5 lines 2-34); a gas inlet port for introducing a gas into said plasma generating chamber (22); a plasma generator for generating positive-negative ion plasma containing positive ions at a density of at least

10. sup. 10 ions/cm. sup. 3 and negative ions from the gas (column 4 lines 40-42); a plasma potential adjustment electrode disposed in said plasma generating chamber (29); and a first power supply for applying a voltage of at most 500 V between said plasma potential adjustment electrode and said grid electrode (column 4 lines 34-39). Hatakeyama teaches all elements and a grid electrode (30) having a plurality of beam extraction holes formed therein of the claimed invention but fails to clearly teach said beam extraction holes having a size of at least 0.5 mm. To have such diameters are obvious to one of ordinary skill in the art since Hatakeyama teaches ways to vary such openings (column 5 line 5- column 6 line 49). One would be compelled to do so depending on the amount of ions being introduced as taught by Hatakeyama.

11. In reference to claim 2, Hatakeyama et al teach a beam source, wherein said plasma generator comprises: a coil disposed near said plasma generating chamber (25); and a second power supply for intermittently supplying a high-frequency current to said coil (24).

12. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,883,470 (Hatakeyama et al) in view of US 4,450,031 (Ono et al). In reference to claim 9, Hatakeyama et al teach a beam processing apparatus having a beam source for applying a beam to the workpiece held by said holder, said beam source

(figures 2, 3) comprising: a plasma generating chamber (21); a gas inlet port for introducing a gas into said plasma generating chamber (22); a plasma generator for generating positive-negative ion plasma containing positive ions at a density of at least  $10^{10}$  ions/cm<sup>3</sup> and negative ions from the gas (column 4 lines 40-42); a plasma potential adjustment electrode disposed in said plasma generating chamber (29); and a first power supply for applying a voltage of at most 500 V between said plasma potential adjustment electrode and said grid electrode (column 4 lines 34-39). Hatakeyama teaches all elements and a grid electrode (30) having a plurality of beam extraction holes formed therein of the claimed invention but fails to clearly teach said beam extraction holes having a size of at least 0.5 mm and a vacuum chamber and a holder disposed in said vacuum chamber for holding a workpiece. To have such diameters are obvious to one of ordinary skill in the art since Hatakeyama teaches ways to vary such openings (column 5 line 5- column 6 line 49). One would be compelled to do so depending on the amount of ions being introduced as taught by Hatakeyama. The limitation of having the said vacuum chamber and holder disposed in the said chamber is notoriously old in the art as shown in the reference of Ono et al (see figures).

13. In reference to claim 10, Hatakeyama et al teach a beam processing, wherein said plasma generator comprises: a coil disposed near said plasma generating

chamber (25); and a second power supply for intermittently supplying a high-frequency current to said coil (24).

14. In reference to claim 11, Hatakeyama et al teach a beam processing apparatus having a beam source for applying a beam to a workpiece, the said beam source (figures 2, 3) comprising: a plasma generating chamber (21); a gas inlet port for introducing a gas into said plasma generating chamber (22); a plasma generator for generating positive-negative ion plasma containing positive ions and negative ions from the gas; a plurality of grid electrodes each having a plurality of beam extraction holes formed therein (29, 30); and a first power supply for applying a voltage between said plurality of grid electrodes to accelerate the positive ions or the negative ions so as to pass through said beam extraction holes formed in said grid electrodes and to extract a neutralized beam from the positive ions or the negative ions or an ion beam (column 4 lines 23-39). Hatakeyama teaches all elements of the claimed invention but fails to clearly teach a vacuum chamber and a holder disposed in said vacuum chamber for holding a workpiece. The limitation of having the said vacuum chamber and holder disposed in the said chamber is notoriously old in the art as shown in the reference of Ono et al (see figures).

15. In reference to claim 12, Hatakeyama et al teach a beam processing, wherein said plasma generator comprises: a coil disposed near said plasma generating



chamber (25); and a second power supply for intermittently supplying a high-frequency current to said coil (24).

16. In reference to claim 13, Hatakeyama et al teach a beam processing apparatus, further comprising a plasma potential adjustment electrode disposed in said plasma generating chamber (29), wherein said first power supply applies a voltage between said plasma potential adjustment electrode and at least one of said grid electrodes (column 4 lines 34-39).

17. In reference to claim 14, Hatakeyama et al teach a beam processing apparatus, wherein said first power supply applies a low voltage such that accelerated ions do not practically sputter said at least one of said grid electrodes (column 4 lines 34-39).

18. In reference to claim 15, Hatakeyama et al teach a beam processing apparatus, wherein said pluralities of beam extraction holes in said plurality of grid electrodes are aligned with each other (column 5 lines 24-26, figure 3).

19. In reference to claim 16, Hatakeyama et al teach a beam processing, wherein said plurality of beam extraction holes in at least one of said grid electrodes has an aspect ratio of at least 10 (column 3 lines 35-56).

*Conclusion*

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. All of the cited US references cited on the attached PTO 892, contain art similar to that being claimed by applicant, more specifically, methods and apparatuses for use in particle beam processing.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johnnie L. Smith II whose telephone number is 571-272-2481. The examiner can normally be reached on Monday-Thursday 7-4 P.M. and Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 571-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
JLSII

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